AUSTRALIA CONNECTS WITH NetComm®

NP5400

Wireless Access Point

11G 54Mbps WIRELESS ACCESS POINT

User Guide

Contents

Chapter 1: Introduction

The NetComm 11G 54Mbps Wireless Access Point

Congratulations on your purchase of the Netcomm 11G 54Mbps Wireless Access Point (AP). This product is designed specifically for high-speed wireless LAN environment needs. It is easy to configure and operate even for non-technical users. Instructions for installing and configuring this product are included in this manual. Before you install and use this product, please read the manual carefully so you may take full advantage of its functions.

- 11g Draft Standards Compliant - The AP complies with IEEE802.11g standard, and it is interoperable with IEEE802.11g-Compliant Equipment.
- Interoperable with IEEE802.11b -Backward compatible with IEEE802.11b equipment.
- Flexible Connectivity - Using external, detachable dipole antenna allows connection of optional Directional Antenna.
- Data Rate Auto Fall-Back - Provides 54, 48, 36, 24,12, 11, 9, 6, 5.5, 2 and 1Mbps wireless data rate shifting dynamically between 11g and 11b to guarantee availability and reliability of wireless connections.
- Roaming - Provides seamless roaming within 802.11g and 802.11b wireless LAN infrastructure.

LAN Features

- Built-in 10/100M LAN Port - It's designed to connect the AP with any 10/100M LAN Hub/ Switch or router.
- DHCP Client - Enable the AP to act as a DHCP client to receive IP address from DHCP Server in the wired Ethernet LAN.

Configuration & Management

- Easy to Setup - With windows-based Wireless Navigator Utility, user can easily setup the IP address of this AP, and upgrade the firmware.
- Easy to manage - User can use any WEB browser from anywhere on the wired or wireless LAN to configure the AP easily.

Security

- Configuring Protection - Provides password protection to prevent unauthorized users from changing the configuration
- Wireless LAN Security - Provide 64-bit & 128-bit Wired Equivalent Privacy encryption to protect the wireless data transmissions.

Chapter 2: Planning Your Wireless Network

Network Topology

A wireless LAN is a group of computers, each equipped with one Instant Wireless Series adapter. Computers in a wireless LAN must be configured to share the same radio channel.

The Instant Wireless Series adapters provide access to a wired LAN for wireless workstations. An integrated wireless and wired LAN is called an infrastructure configuration. A group of Instant Wireless Series adapter users and an Instant Wireless 11g Wireless Access Point compose a Basic Service Set (BSS). Each Instant Wireless Series adapter PC in a BSS can talk to any computer in a wired LAN infrastructure via the 11g Wireless Access Point.

An infrastructure configuration extends the accessibility of an Instant Wireless Series adapter PC to a wired LAN, and doubles the effective wireless transmission range for two Instant Wireless Series adapter PCs. Since the 11g Wireless Access Point is able to forward data within its BSS, the effective transmission range in an infrastructure LAN is doubled.

Roaming

Infrastructure mode also supports roaming capabilities for mobile users. More than one BSS can be configured as an Extended Service Set (ESS). This continuous network allows users to roam freely within an ESS. All PCs equipped with an Instant Wireless Series adapter within one ESS must be configured with the same ESS ID and use the same radio channel.

Before enabling an ESS with roaming capability, choosing a feasible radio channel and optimum 11g Wireless Access Point position is recommended. Proper Access Point positioning combined with a clear radio signal will greatly enhance performance.

How to Make Your Wireless Network More Secure

Wireless networks can be vulnerable to an outsider gaining access if the encryption settings are not set adequately. Some of the default security settings on some wireless hardware, and in Microsoft Windows, may allow access to your wireless network from other wireless devices.

The concepts that are presented here are offered only as a guide, and may help make your wireless network more difficult for an outsider to gain access. For more specific information about the implementation of these suggestions, you should consult a trusted security source.

- Enable Wired Equivalent Privacy (WEP) encryption.

  The 802.11 standard, which your NetComm WLAN device is based on, permits Wired Equivalent Privacy (WEP) encryption. Depending on what other hardware you use, there are two levels of WEP typically available: 64-bit encryption (based on a 40-bit encryption key), and 128-bit encryption (based on a 104-bit key). We strongly recommend that you enable WEP.

- Change the default Service Set Identifier (SSID) and passwords for your network devices.

  Do not change the SSID or password to reflect your name, address, or anything that would be easy to guess as this could make it easy for an outsider to gain access to your wireless network.

- Install Access Points away from windows or building perimeter.

  If you are installing access points, think about locating them towards the centre of your site instead of near the windows. Plan your coverage to radiate out to the windows, but not beyond. If the access points are located near the windows, a stronger signal will be radiated outside your home making it easier for those outside the building to locate your network.

- Check the range of your network.

  Take a notebook, or a PDA computer, that is equipped with a wireless network PC Card and go outside your home to survey what range you get when moving around your property or neighbourhood. You may be surprised how far the signal radiates. If you can connect beyond the perimeter of your property, so can someone else.

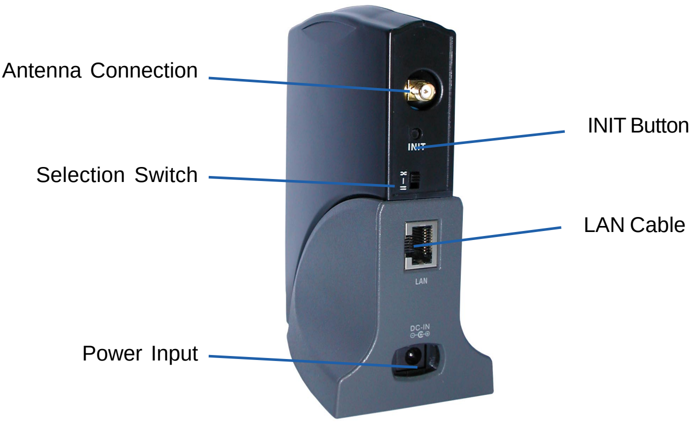
- Disable the Beacon.

  If possible, disabling the beacon will make it harder for hackers to locate and identify your network.

- Use a combination of the previous suggestions.

Chapter 3: Your NetComm 11G Wireless AP

The Back Panel



Antenna Connection

Please install the external dipole antenna directly into the reversed SMA connector of AP. After the AP starts to work, you may adjust the angle of the antenna or reposition the AP to get a better performance and reach.

INIT Button

"INIT" means "Initiation". While pressing the button, the AP will reboot and ERASE all current settings, and restore to factory default settings. The left indicator "DIAG" on the AP will at first be off and then begin blinking. The initiation procedure will be completed when the indicator "DIAG" returns to being always on and green.

LAN Cable

Selection Switch

X Crossover:	the RJ-45 port Tx and Rx lines are reversed. Use this setting when you use the supplied UTP straight cable connected to PC.
II Straight:	the RJ-45 port Tx and Rx lines are normal. Use this setting when you have the supplied UTP straight cable connected to Hub/Switch or Router. It is also the factory default setting.

Power Input

Only use the power adapter supplied with the Access Point LAN Connection

Important: Resetting the Access Point will erase all of your settings (WEP Encryption, Wireless and LAN settings, etc.) and replace them with the factory defaults. Do not reset the Access Point if you want to retain these settings

The Front Panel

LED	Color	Status	Description
Power	Green	ON	The AP power on
		OFF	The AP power off
DIAG	Green	ON	1) The AP is in normal operation mode 2) While in firmware upgrade process, it indicates the AP is writing the firmware into Flash ROM
		Blinking	1) The AP is in self-diagnostic mode. 2) While in firmware upgrade process, it indicates the AP is waiting the Wireless Navigator sending firmware image
		OFF	1) The AP starts to boot up the system. 2) While in firmware upgrade process, it indicates the firmware upgrade process is finished.
LAN	Green	ON	The LAN port has a successful physical link.
		Blinking	Sending or receiving data
		OFF	No connection, and neither data forwarding from LAN ports.
WLAN	Green	ON	Wireless port is connected with another wireless device(s) successfully
		OFF	Wireless port is not connected to any device.
		Blinking	Sending or Receiving data via wireless

Chapter 4: Connecting the Wireless AP

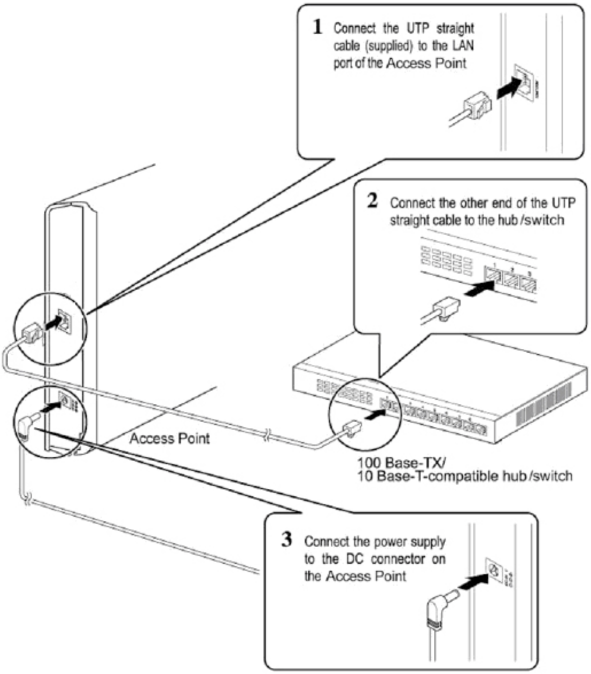
Before continuing, please ensure you have the following package contents ready for the hardware installation.

Package Contents

- One Wireless Access Point
- One External Antenna with Reversed SMA Connector
- One UTP straight LAN Cable (RJ-45 connector)
- One Power Adapter
- One CD-ROM (Wireless Navigator utility software & user's manual included)
- One User Guide

Hardware Installation

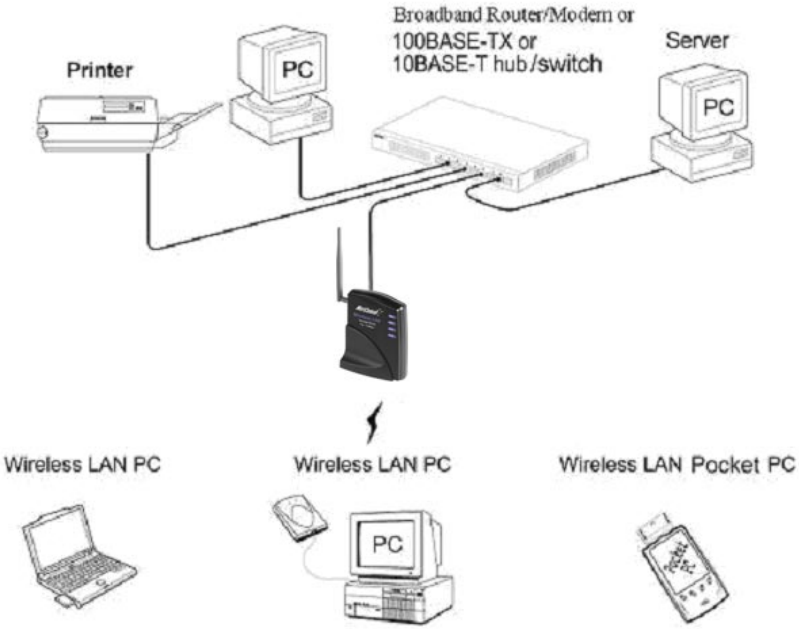
Following illustration is an example showing how to install AP with hub/switch.


1 Connect the UTP straight cable (supplied) to the LAN port of the Access Point
2 Connect the other end of the UTP straight cable to the hub /switch
Access Point
100 Base-TX/
10 Base-T-compatible hub /switch
3 Connect the power supply to the DC connector on the Access Point

1. Find an optimum location for the Access Point. The best place for the Access Point is usually at the center of your wireless network, with line of sight to all of your mobile stations. Placing the unit in the celing is ideal.
2. Fix the direction of the antenna. Try to place it in a position which can best cover your wireless network. Normally, the higher you place the antenna, the better the performance will be. The antenna's position enhances the receiving sensitivity.
3. Connect a standard Ethernet network cable to the Access Point. Then, connect the other end of the Ethernet cable to a switch or hub. The Access Point will then be connected to your wired Network.
4. Connect the AC Power Adapter to the Access Point's Power port and plug the other end into an electrical outlet. Only use the power adapter supplied with the Access Point. Use of a different adapter may result in product damage.

Now that the hardware installation is complete, proceed to Chapter 5: Setting Up the 11g Wireless Access Point for directions on how to set up the Access Point.

Note: In order for all other wireless devices to communicate with the Access Point, those devices must be operating in Infrastructure Mode. If any wireless devices are configured in Ad Hoc Mode, they will not be recognized by the Access Point.



Chapter 5: Setting Up the Wireless Access Point

Connecting the AP to your Network

For optimal performance, usually the center of your wireless network is the best place for your AP, with line of sight to all of your mobile stations. Try to place it in a position where can best cover your wireless network and is away from any potential source of interference. And normally, the higher you place the AP, the better the wireless signal coverage will be.

The following picture describes how to use the AP when communicating between wireless LAN and wired LAN.

Setting Up TCP/IP in Windows

Before a computer can communicate with the Access Point, it must be configured with the TCP/IP protocol. If you know how to set up TCP/IP on your computers, do so now. Otherwise, use the guidelines below to help get TCP/IP installed on all of the computers that need to communicate with the Access Point. If you are unable to successfully install TCP/IP on one or more computers after following the directions, contact the manufacturer of your computers' network operating system for further assistance. Check with your network administrator for your TCP/IP settings.

The directions below provide general guidelines for coming up with IP addresses and subnet masks. Check with your network administrator to see if you need to use specific IP addresses or DHCP settings.

First, each computer on the network will require an IP address, which is a series of numbers, separated by periods, identifying the PC on the network. To make things simple, you should use the following numbering scheme:

192.168.1.X

In this example, X is a unique, arbitrarily assigned number from 1 to 254. Each computer must have its own unique X number. Note: Never use 0, 250 or 255 for X. These numbers are reserved by TCP/IP for other uses.

Each computer will also require a subnet mask, which is a numerical "filter" that tells a computer what kinds of TCP/IP data packets to accept. If you're not sure which mask to use, the following mask is recommended:

255.255.255.0

The following instructions are provided as examples for reference only. For complete instructions on installing and troubleshooting TCP/IP please consult your Windows operating system documentation.

TCP/IP Setup for Windows 98 and Millennium

1. Click the Start button, select Settings, and open the Control Panel. Inside the Control Panel, double-click the Network icon.
2. If the TCP/IP Protocol is listed for your network adapter, go to step five. Otherwise, click the Add button.
3. When the Component Type window appears, select Protocol and click the Add button.
4. Select Microsoft in the Manufacturers list and choose TCP/IP in the Network Protocols list. Then, click the OK button.
5. When the Network window reappears, click TCP/IP. Then, click the Properties button.
6. Select Specify an IP Address.
7. Enter an IP Address for the computer, along with a Subnet Mask. Click the OK button. If you do not have these values, consult your network administrator.
8. When the Network window reappears, click the OK button. Restart your machine. TCP/IP has now been successfully installed.

TCP/IP Setup for Windows NT4.0

1. Click the Start button, select Settings, and open the Control Panel. Inside the Control Panel, double-click the Network icon.
2. When the Network window appears, click the Protocols tab. Then, click the Add button.
3. Find the TCP/IP protocol in the Select Network Protocol field. Click it once and then click the OK button.
4. When asked if you want to use DHCP, choose No.
5. If asked to supply your Windows NT CD, do so. NT will copy the necessary files to your system. You may have to switch between the Access Point's Setup CD and the NT CD.
6. When TCP/IP appears in the Network Protocols window, click the Bindings tab. Windows will store your new bindings.
7. Click the Protocols tab. Then, select TCP/IP.
8. Click the Properties button. Select the type of network adapter you have from the Adapters box and select Specify an IP Address.
9. Enter the computer's IP Address and Subnet Mask. Check with your network administrator for your settings.
10. Enter your Default Gateway if you have one.

Note: a Default Gateway is not required. Check with your network administrator.

11. When you finish, click the OK button. If NT asks about WINS, ignore it.
12. When the Network window reappears, click the Close button. Restart your computer when prompted. TCP/IP has now been successfully installed.

TCP/IP Setup for Windows 2000

1. At the Windows 2000 desktop, right click My Network Places and select Properties. Then, right click Local Area Connection. Choose Properties.
2. If the TCP/IP Protocol is listed for your network adapter, go to step five. Otherwise, click the Install button.
3. When the Component Type window appears, select Protocol, and click the Add button.
4. Select Internet Protocol (TCP/IP) from the list and click the OK button.
5. When the Local Area Connection Properties window reappears, select TCP/IP, and click the Properties button.
6. Select Use the following IP Address.
7. Enter an IP Address for the computer, along with a Subnet Mask and Default Gateway. Then, click the OK button. If you do not have these values, consult your network administrator.
8. When the Local Area Connection Properties window reappears, click the OK button. TCP/IP has now been successfully installed.

TCP/IP Setup for Windows XP

1. Click the Start button and open the Control Panel.
2. Double click the Network and Internet Connections icon.
3. Double click the Network Connections icon.
4. Right click the Local Area Connection icon and select Properties.
5. If the TCP/IP Protocol is listed for your network adapter, go to step five. Otherwise, click the Install button.
6. When the Component Type window appears, select Protocol, and click the Add button.
7. Select Internet Protocol (TCP/IP) from the list and click the OK button.
8. When the Local Area Connection Properties window reappears, select TCP/IP, and click the Properties button.
9. Select Use the following IP Address.
10. Enter an IP Address for the computer, along with a Subnet Mask and Default Gateway. Then, click the OK button. If you do not have these values, consult your network administrator.
11. When the Local Area Connection Properties window reappears, click the OK button. TCP/IP has now been successfully installed.

Installing the Wireless Navigator

The Wireless Navigator Utility is provided to allow user(s) easily to configure the AP through any Windows-based PC over wired or wireless LAN port. This section describes procedures for installing the Wireless Navigator Utility to PC.

1. Insert the installation CD-ROM into the CD-ROM drive. Run SETUP.EXE program on the CD-ROM.
2. After the InstallShield Wizard preparation has completed finished, the Install Shield window will be shown. Click the Next button to continue.
3. Key in your User Name and Company Name, and click Next button to continue.
4. The screen will show you the default destination chosen by the utility. If you wish to install the Wireless Navigator in another location, click the Browse button and select an alternate destination. Click the Next button when you are ready to continue. The setup program will then begin to install the programs into the destination folder.
5. The screen will show you the Program Folder that the utility will use. You may type a new folder name to create a new program folder, or select one from the existing folder list, and click Next button to continue.
6. The Wireless Navigator has been installed now. Please click the Finish button to complete installation.

Note: To remove Wireless Navigator Utility, click the Start button, and select Programs, Wireless Navigator, and Uninstall, and then follow the instruction on screen.

Startup and Login

Follow the procedures below to startup Wireless Navigator and find the AP. Before you start the following procedure, please connect the Ethernet cable, connect the power cord, and then turn on the AP. All wireless clients should be requested to set the their SSIDs to the same as the AP SSID in advance before continuing.

1. Refer to previous section "Install the Wireless Navigator to your PC" in order to startup the configuration.

2. Click Start and select Programs, Wireless Navigator and then Wireless Navigator. Or, just double-click the Wireless Navigator icon on your desktop screen.

3. The Wireless Navigator starts up, and searches AP via wired LAN or Wireless LAN.

4. The utility will show the AP and any other wireless devices found in the same network.

Note! If the AP is not shown in the list, please make sure all the cables are well connected.

5. Double-click on the AP device to access the built-in web server. The User Name and Password screen will be displayed. The default setting is no user name and the password is "admin". Click OK to continue.

Note! If you cannot access into AP's built-in web server, please make sure if your PC now is in the same subnet with AP. Please us right-click of mouse to click on the AP listed in Wireless Navigator. "Set IP address" option will pop out, and then change IP address of AP to the same subnet as your PC.

6. Now you have entered the built-in web server of this AP, you can begin configuration procedures.

Configuring the Access Point

The Wireless Navigator includes nine tabs to help you customise your Access Point settings to fit your Network:

- the Info tab
- the Assoc tab
- the Wireless tab
- the Access tab
- the Advanced tab
- the Security tab
- the IP Address tab
- the Admin tab
- the Help tab

The Info Tab

The Info Tab displays the current AP settings.

Access Point Information

Access point name: Displays current device name of the AP. You also can change the name.

MAC address of AP: Displays the unique fMAC number burned into this AP that identifies itself from other Ethernet devices

Associated stations: Displays the number of wireless client devices associated with this AP.

Wireless Firmware version: Displays the version number of wireless LAN firmware embedded in this AP.

AP version: Displays the version number of AP system firmware.

Current IP settingsIP address: Displays the current IP address of this AP.

DHCP client: Displays if this AP enable DHCP client feature or not.

Current Wireless
SettingsPerformance Mode: Displays the AP is set in Maximum interoperability mode or Maximum performance mode.

Wireless network name (SSID): Displays current SSID of the AP. Please make sure that your wireless LAN is working properly under the effective reach range of the AP

WEP: Displays the WEP function is enabled or disabled.

The Assoc Tab

The Assoc Tab displays all the wireless clients, which are currently associated with this AP.

Mac address: Displays the list of the MAC address of associated wireless client.If you click the refresh button of your web browser, then the list will be updated.

The Wireless Tab

The Wireless Tab lets you select the network settings.

Performance Mode: In Maximum interoperability mode, the AP will accept connections to both 802.11b and 802.11g client devices. In Maximum performance mode, the AP will only connect to 802.11g client devices for better performance.

Wireless Network Name (SSID): Lets you set the Service Set Identification. Default SSID is "wireless". This should be changed to some thing non-descriptive.

Channel: Enables you to select a transmission channel. This setting only works in infrastructure mode.

Transmission Rate: Select transfer rate from an available list.

Note: Click button "Save" to store the settings. The settings will work after AP automatically reboots.

The Access Tab

The Access Tab allows you to set the filter to specific wireless client device(s).

Enable access control: If it is checked, the AP will start to filter any wireless client device with MAC address listed below.

MAC address #: Please enter the MAC address of the wireless devices which need filtered in wireless LAN network. The device with same MAC address listed will not be able to associate with this AP.

Note: Click button "Save" to store the settings. The settings will work after AP automatically reboots.

The Advanced Tab

The Advanced Tab allows you to configure advanced 802.11 settings

Preamble type: Enables to select different preamble types: Long, Short or Auto. While Short type is selected, the performance may be improved with the possibility of incompatibility

Max associated stations: Enables to set the limit of the maximum number of associated clients. In order to get a better performance, it is suggested to set "8" as the maximum number of associated clients to get a balanced performance

Fragmentation threshold: The threshold which a data packet will be fragmented.RTS threshold: The threshold which a RTS packet will be sent before a data packet is sent.

Beacon period: The period in millisecond a beacon will be sent.DTIM interval: Number of beacon intervals between successive DTIM (Delivery Traffic Identification Maps).

Note: Click button "Save" to store the settings. The settings will work after AP automatically reboots.

The Security Tab

The Security Tab displays 802.11b/g security and encryption options on this AP.

WEP configuration: Display the Wired Equivalent Privacy security configurations

Enable WEP: Enables the Wired Equivalent Privacy security function.

WEP key length: Selects 64-bit or 128-bit WEP encryption. Be sure that the key length setting in the AP shall be the same as in wireless clients, or the communication will not work.

WEP key: For 64-bit WEP encryption, a key of 10 hexadecimal characters in length must be filled in. For 128-bit WEP encryption, a key of 26 hexadecimal characters in length must be filled in. Be sure that the key values in the AP shall be the same as in wireless clients, or the communication will not work.

Default WEP key to use: Selects one of four key sets to be used for encryption. To connect to a Wi-Fi compliant wireless device, key #1 must be selected.

Deny unencrypted data: Check this box, then any unencrypted data frames will be denied.

Authentication: Selects the mechanism of Open, Shared key, or both authentication algorithms.

Firmware upgrading: To control firmware upgrade

Allow upgrade uploads: If the box is checked, then users can use utility or any TFTP program to upgrade the firmware.

Note: Click button "Save" to store the settings. The settings will work after AP automatically reboots.

The IP Address Tab

The IP Address Tab displays IP settings options on this AP.

IP Address Mode: Select "Static" or "DHCP" mode. For "Static" mode, the IP address settings are given by user. For "DHCP" mode, these settings will be overridden by a DHCP server on your network. The default setting is "Static"

Default IP Address: The static IP address you want to assign to the AP. The default value is "192.168.1.100".

Default subnet mask: The subnet mask you want to assign for the AP. The default value is "255.255.255.0".

Default gateway: The internet gateway you want to assign for the AP. The default value is "192.168.1.1".

Access point name: With the name, the AP can be found easily via Wireless Nevigator Utility. It can be the nickname assigned by the adminstrator.

Note: Click button "Save" to store the settings. The settings will work after AP automatically reboots.

The Admin Tab

The Admin Tab allows to change the device's system configurations.

Access point name: With this unque name, the AP can be found easily via Wireless Nevigator Utility. It can be the nickname assigned by the adminstrator.

User name: This is the name used for login into the AP's built Web User Interface.

Administrator password: Please key the same password in both columns, then click "Save" to validate the new password

Commands

Reboot access point: When any setting was changed, the AP MUST be reboot so that the change can be confirmed.

Reset to factory defaults: This option will ERASE all the current settings, and return back to the factory defaults.

Note: Click button "Save" to store the settings. The settings will work after AP automatically reboots.

The Help Tab

The Help Tab displays the explanations of each setting shown in above seven tabs.Please click those hyperlinks in right side, and then it will direct you the meaning of each setting.

Firmware Upgrade Procedure

1. Click Start and select Programs, Wireless Navigator and then Wireless Navigator. Or, just double-click the Wireless Navigator icon on your desktop screen.
2. The Wireless Navigator starts up.
3. The computer starts searching for the Access Point and shows in the list. Choose the AP that you would like to upgrade the firmware, and use the right-click of the mouse to enter the "Upgrade FW" option
4. The download will begin. Key in the new firmware file name and location or click browsing to find the file in your computer.
5. After entering the file information, click OK to continue.
6. The downloading begins.
7. After download finished, the AP will reset automatically, and the left indicator "DIAG" on AP will be off and then begin flashing. When the indicator " DIAG" is always green instead of blinking, the firmware upgrade is completed and successfully.

Appendix A: Troubleshooting

This section provides solutions to problems usually encountered during the installation and operation of the Access Point.

Frequently Asked Questions

Can the Access Point act as my DHCP Server?

No. The Access Point is nothing more than a wireless hub, and as such cannot be configured to handle DHCP capabilities.

Can I run an application from a remote computer over the wireless network?

This will depend on whether or not the application is designed to be used over a network. Consult the application's user guide to determine if it supports operation over a network.

Can I play multiplayer games with other users of the wireless network?

Yes, as long as the game supports multiple players over a LAN (local area network). Refer to the game's user guide for more information.

What are Ad-hoc and Infrastructure modes?

An Ad-hoc wireless LAN is a group of computers, each with a WLAN adapter, connected as an independent wireless LAN. An Ad-hoc wireless LAN is applicable when no AP is available or you wish to run a private network not joined to the corporate network.

An integrated wireless and wired LAN is called an Infrastructure configuration. Infrastructure is applicable to enterprise scale for wireless access to a wired network via an AP.

What is Roaming?

Roaming is the ability of a portable computer user to communicate continuously while moving freely throughout an area greater than that covered by a single Access Point. Before using the roaming function, the workstation must make sure that it is the same channel number as the Access Point of the dedicated coverage area.

To achieve true seamless connectivity, the wireless LAN must incorporate a number of different functions. Each node and Access Point, for example, must always acknowledge receipt of each message. Each node must maintain contact with the wireless network even when not actually transmitting data. Achieving these functions simultaneously requires a dynamic RF networking technology that links Access Points and nodes. In such a system, the user's end node undertakes a search for the best possible access to the system. First, it evaluates such factors as signal strength and quality, as well as the message load currently being carried by each Access Point and the distance of each Access Point to the wired backbone. Based on that information, the node next selects the right Access Point and registers its address. Communications between end node and host computer can then be transmitted up and down the backbone.

As the user moves on, the end node's RF transmitter regularly checks the system to determine whether it is in touch with the original Access Point or whether it should seek a new one. When a node no longer receives acknowledgment from its original Access Point, it undertakes a new search. Upon finding a new Access Point, it then re-registers, and the communication process continues.

What is BSS ID?

A specific Ad-hoc LAN is called a Basic Service Set (BSS). Computers in a BSS must be configured with the same BSS ID.

What is ESSID?

An Infrastructure configuration could also support roaming capability for mobile workers. More than one BSS can be configured as an Extended Service Set (ESS). Users within an ESS could roam freely between BSSs while maintaining a continuous connection to the wireless network stations and Access Points.

What is ISM band?

The FCC and their counterparts outside of the U.S. have set aside bandwidth for unlicensed use in the ISM (Industrial, Scientific and Medical) band. Spectrum in the vicinity of 2.4 GHz, in particular, is being made available worldwide. This presents a truly revolutionary opportunity to place convenient high speed wireless capabilities in the hands of users around the globe.

What is Spread Spectrum?

Spread Spectrum technology is a wideband radio frequency technique developed by the military for use in reliable, secure, mission-critical communications systems. It is designed to trade off bandwidth efficiency for reliability, integrity, and security. In other words, more bandwidth is consumed than in the case of narrowband transmission, but the trade-off produces a signal that is, in effect, louder and thus easier to detect, provided that the receiver knows the parameters of the spread-spectrum signal being broadcast. If a receiver is not tuned to the right frequency, a spread-spectrum signal looks like background noise. There are two main alternatives, Direct Sequence Spread Spectrum (DSSS) and Frequency Hopping Spread Spectrum (FHSS).

What is DSSS? What is FHSS? And what are their differences?

Frequency Hopping Spread Spectrum (FHSS) uses a narrowband carrier that changes frequency in a pattern that is known to both transmitter and receiver. Properly synchronized, the net effect is to maintain a single logical channel. To an unintended receiver, FHSS appears to be short-duration impulse noise. Direct Sequence Spread Spectrum (DSSS) generates a redundant bit pattern for each bit to be transmitted. This bit pattern is called a chip (or chipping code). The longer the chip, the greater the probability that the original data can be recovered. Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the radio can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers.

Would the information be intercepted while transmitting on air?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, the WLAN series offers the encryption function (WEP) to enhance security and access control. Users can set it up depending upon their needs.

What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a shared-key algorithm, as described in the IEEE 802.11 standard.

What is a MACAddress?

The Media Access Control (MAC) address is a unique number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level. For all practical purposes, this number is usually permanent. Unlike IP addresses, which can change every time a computer logs on to the network, the MAC address of a device stays the same, making it a valuable identifier for the network.

How do I avoid interference?

Using multiple Access Points on the same channel and in close proximity to one another will generate interference. When employing multiple Access Points, be sure to operate each one on a different channel (frequency).

How do I reset the Access Point?

Press the Reset button on the back of the Access Point for about ten seconds. This will reset the unit to its default settings.

How do I resolve issues with signal loss?

There is no way to know the exact range of your wireless network without testing. Every obstacle placed between an Access Point and wireless PC will create signal loss. Leaded glass, metal, concrete floors, water and walls will inhibit the signal and reduce range. Start with your Access Point and your wireless PC in the same room and move it away in small increments to determine the maximum range in your environment.

You may also try using different channels, as this may eliminate interference affecting only one channel. Also, due to FCC regulations, more power may be transmitted, using 802.11a, on channels 52, 56, 60 and 64, than on the lower channels. Lastly, check the Advanced tab of the Web-Based Utility and make sure that FULL is selected in the Transmission Rate field.

Does the Access Point function as a firewall?

No. The Access Point is only a bridge from wired Ethernet to wireless clients.

I have excellent signal strength,but I cannot see my network.

WEP is probably enabled on the Access Point, but not on your wireless adapter (or vice versa). Verify that the same WEP Keys and levels (64 or 128) are being used on all nodes on your wireless network. Also we suggest you check for MAC filtering.

What is the maximum number of users the Access Point facilitates?

No more than 65, but this depends on the volume of data and may be less if many users create a large amount of network traffic.

How many channels/frequencies are available with the Access Point?

Using 802.11b or 802.11g, there are eleven available channels, ranging from 1 to 11.

Appendix B: Glossary

802.11b

One of the IEEE standards for wireless networking hardware. Products that adhere to a specific IEEE standard will work with each other, even if they are manufactured by different companies. The 802.11b standard specifies a maximum data transfer rate of 11Mbps, an operating frequency of 2.4GHz, and WEP encryption for security. 802.11b networks are also referred to as Wi-Fi networks.

802.11g

Refers to the proposed of the IEEE 802.11 standard for wireless networking. The 802.11g specifications used by NetComm specifies a maximum data transfer rate of 54Mbps using OFDM modulation, an operating frequency of 2.4GHz, backward compatibility with IEEE 802.11b devices and WEP encryption for security.

Ad-hoc Network

An ad-hoc network is a group of computers, each with a wireless adapter, connected as an independent 802.11 wireless LAN. Ad-hoc wireless computers operate on a peer-to-peer basis, communicating directly with each other without the use of an access point. Ad-hoc mode is also referred to as an Independent Basic Service Set (IBSS) or as peer-to-peer mode, and is useful at a departmental scale or SOHO operation.

CTS (Clear To Send)

An RS-232 signal sent from the receiving station to the transmitting station that indicates it is ready to accept data.

Default Gateway

The router used to forward all traffic that is not addressed to a station within the local subnet.

DHCP

(Dynamic Host Configuration Protocol) - A protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet's set of protocol (TCP/IP), each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network. DHCP uses the concept of a "lease" or amount of time that a given IP address will be valid for a computer.

The lease time can vary depending on how long a user is likely to require the Internet connection at a particular location. It's especially useful in education and other environments where users change frequently. Using very short leases, DHCP can dynamically reconfigure networks in which there are more computers than there are available IP addresses.

DHCP supports static addresses for computers containing Web servers that need a permanent IP address. DNS - The domain name system (DNS) is the way that Internet domain name are located and translated into Internet Protocol (IP) addresses. A domain name is a meaningful and easy-to-remember "handle" for an Internet address.

DSSS

(Direct-Sequence Spread Spectrum) - DSSS generates a redundant bit pattern for all transmitted data. This bit pattern is called a chip (or chipping code). Even if one or more bits in the chip are damaged during transmission, statistical techniques embedded in the receiver can recover the original data without the need for retransmission. To an unintended receiver, DSSS appears as low power wideband noise and is rejected (ignored) by most narrowband receivers. However, to an intended receiver (i.e. another wireless LAN endpoint), the DSSS signal is recognized as the only valid signal, and interference is inherently rejected (ignored).

Dynamic IP Address

An IP address that is automatically assigned to a client station in a TCP/IP network, typically by a DHCP server. Network devices that serve multiple users, such as servers and printers, are usually assigned static IP addresses.

ESS

(Extended Service Set) - A set of more than two or more BSSs (multiple access points) forming a single network.

Firmware

Code that is written onto read-only memory (ROM) or programmable read-only memory (PROM). Once firmware has been written onto the ROM or PROM, it is retained even when the device is turned off.

IEEE

The Institute of Electrical and Electronics Engineers. The IEEE describes itself as "the world's largest technical professional society-promoting the development and application of electrotechnology and allied sciences for the benefit of humanity, the advancement of the profession, and the wellbeing of our members." The IEEE fosters the development of standards that often become national and international standards. The organization publishes a number of journals, has many local chapters, and several large societies in special areas, such as the IEEE Computer Society.

Infrastructure Network

An infrastructure network is a group of computers or other devices, each with a wireless adapter, connected as an 802.11 wireless LAN. In infrastructure mode, the wireless devices communicate with each other and to a wired network by first going through an access point. An infrastructure wireless network connected to a wired network is referred to as a Basic Service Set (BSS). A set of two or more BSS in a single network is referred to as an Extended Service Set (ESS). Infrastructure mode is useful at a corporation scale, or when it is necessary to connect the wired and wireless networks.

IP Address

In the most widely installed level of the Internet Protocol (IP) today, an IP address is a 32-binary digit number that identifies each sender or receiver of information that is sent in packet across the Internet. When you request an HTML page or send e-mail, the Internet Protocol part of TCP/IP includes your IP address in the message (actually, in each of the packets if more than one is required) and sends it to the IP address that is obtained by looking up the domain name in the Uniform Resource Locator you requested or in the e-mail address you're sending a note to. At the other end, the recipient can see the IP address of the Web page requester or the e-mail sender and can respond by sending another message using the IP address it received.

IPCONFIG

A utility that provides for querying, defining and managing IP addresses within a network. A commonly used utility, under Windows NT and 2000, for configuring networks with static IP addresses.

ISP

An ISP (Internet service provider) is a company that provides individuals and companies access to the Internet and other related services such as Web site building and virtual hosting.

LAN

A local area network (LAN) is a group of computers and associated devices that share a common communications line and typically share the resources of a single processor or server within a small geographic area (for example, within an office building).

MACAddress

The MAC (Media Access Control) address is your computer's unique hardware number.

mIRC

mIRC runs under Windows and provides a graphical interface for logging onto IRC servers and listing, joining and leaving channels.

Network Mask

also known as the "Subnet Mask."

OFDM

Developed for wireless applications, Orthogonal Frequency Division Multiplexing (OFDM) technology offers superior performance-increased data rates and more reliable transmissions-than previous technologies, such as DSSS. OFDM is a scheme in which numerous signals of different frequencies are combined to form a single signal for transmission on the medium. OFDM works by breaking one high-speed data stream into a number of lower-speed data streams, which are then transmitted in parallel. Each lower speed stream is used to modulate a subcarrier. Essentially, this creates a multi-carrier transmission by dividing a wide frequency band or channel into a number of narrower frequency bands or sub-channels. OFDM is also used for other applications, including powerline networking.

Plug-and-Play

The ability of a computer system to configure expansion boards and other devices automatically without requiring the user to turn off the system during installation.

Roaming

In an infrastructure mode wireless network, this refers to the ability to move out of one access point's range and into another and transparently reassociate and reauthenticate to the new access point. This reassociation and reauthentication should occur without user intervention and ideally without interruption to network connectivity. A typical scenario would be a location with multiple access points, where users can physically relocate from one area to another and easily maintain connectivity.

SSID

(Service Set Identifier) - An identification name that wireless devices use to make connections. In order for wireless devices to communicate, they must all be set to the same channel and they all must use the same SSID. For instance, if you are using an access point to connect two computers using wireless devices, the access point and each of the wireless devices must use the same SSID. Even if they are set to the same channel, they cannot communicate unless the SSID is the same.

Static IP Address

A permanent IP address that is assigned to a node in a TCP/ IP network.

Subnet Mask

The method used for splitting IP networks into a series of subgroups, or subnets. The mask is a binary pattern that is matched up with the IP address to turn part of the host ID address field into a field for subnets.

TCP

(Transmission Control Protocol) - A method (protocol) used along with the IP (Internet Protocol) to send data in the form of message units (datagram) between network devices over a LAN or WAN. While IP takes care of handling the actual delivery of the data (routing), TCP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient delivery over the network. TCP is known as a "connection oriented" protocol due to requiring the receiver of a packet to return an acknowledgment of receipt to the sender of the packet resulting in transmission control.

TCP/IP

(Transmission Control Protocol/Internet Protocol) - The basic communication language or set of protocols for communications over a network (developed specifically for the Internet). TCP/IP defines a suite or group of protocols and not only TCP and IP.

UDP

(User Datagram Protocol) - A method (protocol) used along with the IP (Internet Protocol) to send data in the form of message units (datagram) between network devices over a LAN or WAN. While IP takes care of handling the actual delivery of the data (routing), UDP takes care of keeping track of the individual units of data (called packets) that a message is divided into for efficient delivery over the network. UDP is known as a "connection-less" protocol due to NOT requiring the receiver of a packet to return an acknowledgment of receipt to the sender of the packet (as opposed to TCP).

WEP

(Wired Equivalent Privacy) - A data privacy mechanism based on a 64-bit shared key algorithm, as described in the IEEE 802.11b standard.

WINIPCFG

Configuration utility based on the Win32 API for querying, defining and managing IP addresses within a network. A commonly used utility under Windows 95, 98SE, and Me.

WLAN

(Wireless Local Area Network) - A group of computers and associated devices that communicate with each other wirelessly.

Appendix C: Specifications

Standards:	IEEE 802.11/11g and 802.11b standard compliant
Antenna	Single external antenna with reversed SMA connector
Frequency Range	2.4-2.4835GHz (Industrial Scientific Medical Band)
Operating Channels	11b Mode:
	11 Channels (USA, Canada)
	13 Channels (Europe, Australia)
	14 channels (Japan)
	11g Mode:
	11 Channels (USA, Canada)
	13 Channels (Europe, Japan, Australia)
Modulation Technology	CCK for 11b mode (1, 2, 5.5, 11Mbps)
	OFDM for 11g mode (6, 9, 12, 24, 36, 48, 54Mbps)
Data Transmission Rate	54Mbps / 48 / 36 / 24 / 12 / 11 / 9 / 6 / 5.5 / 2 / 1 Mbps Auto Fall-Back
Access Mode	Infrastructure mode
	Ad-hoc mode
Data Security	Provides both 64-bit & 128-bit WEP Encryption
Output Power	18 dBm @ 11M CCK
	14 dBm @ 54M OFDM
Roaming	IEEE 802.11 Compliant
Operating Environment	Operating Temperature: 0oC to 50oC degree
	Storage Temperature: -25oC to 70oC degree
	Humidity 10% to 90% non-condensing

Registering your NetComm Product

To ensure that the conditions of your warranty are complied with, please go to the NetComm web site for quick and easy registration of your product at

www.netcomm.com.au

Alternatively, you can complete the Warranty Registration Form on the following page and mail it to NetComm Limited, PO Box 1200, Lane Cove NSW 2066.

Trademarks and Notices

NetComm™ is a trademark of NetComm Limited. Windows® is a registered trademark of Microsoft Corporation. Other brand and product names are trademarks or registered trademarks of their respective holders. Information is subject to change without notice. All rights reserved.

Please note that the images used in this document may vary slightly from those of the actual product. Specifications are accurate at the time of the preparation of this document but are subject to change without notice.

Cut along the line

Warranty Registration Form

Date of Purchase ....

Name ....

Company ....

Address ....

.... Post Code ....

Tel No ( ) .... Fax No ( ) ....

E-mail ....

The following information is vital for your warranty

Please make sure it's correct and complete.

Serial No ....

Model ....

Product Type:

□ PC Card □ External

□ Internal □ Other

! Make sure you fill this section in!

I intend to use this modem at:

□ Home □ School/College/University

□ Business □ Government Office

Dealer's Name ....

Dealer's Address ....

.... Post Code ....

Tel No ( ) .... Fax No ( ) ....

How did you find out about our products?

....

....

Product Warranty

The warranty is granted on the following conditions:

1. This warranty extends to the original purchaser (you) and is not transferable;
2. This warranty shall not apply to software programs, batteries, power supplies, cables or other accessories supplied in or with the product;
3. The customer complies with all of the terms of any relevant agreement with NetComm and any other reasonable requirements of NetComm including producing such evidence of purchase as NetComm may require;
4. The cost of transporting product to and from NetComm's nominated premises is your responsibility; and,
5. NetComm does not have any liability or responsibility under this warranty where any cost, loss, injury or damage of any kind, whether direct, indirect, consequential, incidental or otherwise arises out of events beyond NetComm's reasonable control. This includes but is not limited to: acts of God, war, riot, embargoes, acts of civil or military authorities, fire, floods, electricity outages, lightning, power surges, or shortages of materials or labour.
6. The customer is responsible for the security of their computer and network at all times. Security features may be disabled within the factory default settings. NetComm recommends that you enable these features to enhance your security.

The warranty is automatically voided if:

1. You, or someone else, use the product, or attempts to use it, other than as specified by NetComm;
2. The fault or defect in your product is the result of a voltage surge subjected to the product either by the way of power supply or communication line, whether caused by thunderstorm activity or any other cause(s);
3. The fault is the result of accidental damage or damage in transit, including but not limited to liquid spillage;
4. Your product has been used for any purposes other than that for which it is sold, or in any way other than in strict accordance with the user manual supplied;
5. Your product has been repaired or modified or attempted to be repaired or modified, other than by a qualified person at a service centre authorised by NetComm; and,
6. The serial number has been defaced or altered in any way or if the serial number plate has been removed.

Limitations of Warranty

The Trade Practices Act 1974 and corresponding State and Territory Fair Trading Acts or legalisation of another Government ("the relevant acts") in certain circumstances imply mandatory conditions and warranties which cannot be excluded. This warranty is in addition to and not in replacement for such conditions and warranties.

To the extent permitted by the Relevant Acts, in relation to your product and any other materials provided with the product ("the Goods") the liability of NetComm under the Relevant Acts is limited to, at the option of NetComm to:

- Replacement of the Goods; or
- Repair of the Goods; or
- Payment of the cost of replacing the Goods; or
- Payment of the cost of having the Goods repaired.

All NetComm ACN 002 490 486 products have a standard 12 months warranty from date of purchase. However some products have an extended warranty option (refer to packaging). To be eligible for the extended warranty you must supply the requested warranty information to NetComm within 30 days of the original purchase by registering on-line via the NetComm web site at www.netcomm.com.au.

NetComm reserves the right to request proof of purchase upon any warranty claim.

Specifications

Standards

IEEE 802.11/11g and 802.11b standard compliant

Antenna

Single external antenna with reversed SMA connector

Frequency Range

2.4-2.4835GHz (Industrial Scientific Medical Band)

Operating Channels

11b Mode:

- 11 Channels (USA, Canada)
- 13 Channels (Europe, Australia)
- 14 channels (Japan)

11g Mode:

- 11 Channels (USA, Canada)
- 13 Channels (Europe, Japan, Australia)

Modulation Technology

CCK for 11b mode (1, 2, 5.5, 11Mbps)

OFDM for 11g mode (6, 9, 12, 24, 36, 48, 54Mbps)

Data Transmission Rate

54Mbps / 48 / 36 / 24 / 12 / 11 / 9 / 6 / 5.5 / 2 / 1 Mbps

Auto Fall-Back

Access Mode

Infrastructure mode

Ad-hoc mode

Data Security

Provides both 64-bit & 128-bit WEP Encryption

Output Power

18 dBm @ 11M CCK

14 dBm @ 54M OFDM

Roaming

IEEE 802.11 Compliant

Operating Environment

Operating Temperature: 0oC to 50oC degree

Storage Temperature: -25oC to 70oC degree

Humidity 10% to 90% non-condensing

NetComm®

AUSTRALIA CONNECTS WITH

Wireless Access Point

11G 54Mbps WIRELESS ACCESS POINT

NP5400